skeleton that must have suggested itself, ghost-like, to the learned Professor's mind. And it is among my keen personal regrets for the loss the world has sustained through the decease of Prof. Huxley, that I should have been deprived by so short an interval of gladdening my former teacher's eyes with the sight of a living organism which, if only in the direction of superficial analogy, so nearly realised one, among the many, of his most sagacious interpretations of the fossil past. One remaining point in the erect running gait of *Chlamydosaurus* invites brief attention. Such is the conformation of the hind foot and its component digits, that when thus running the three central digits only rest upon the ground. As a consequence of this structural peculiarity, the tract made by this lizard when passing erect over damp sand or other impressible soil, would be tridactyle like that of a bird, and would also correspond with such as are left in Mesozoic strata by various typical Dinosauria. This tridigitigrade formula of the gradation of *Chlamydosaurus*, induced by the great relative shortness of the first and fifth digits, is distinctly indicated in the second of the accompanying figures.

Whether or not the bipedal locomotive comportment of *Chlamydosaurus* has been transmitted by heredity from a lizard-like Dinosaurian such as *Compsognathus*, or has been re-developed independently among its allocated family group of the Agamidæ, is a question concerning which, I humbly recognise, it would be unbecoming temerity on my part to pronounce a verdict. The phenomenon, while dominant among the Reptilia of bygone ages, is, with the exceptional instance afforded by *Chlamydosaurus*, extinct among living types, and is, on that account alone, of unique interest.

Without overstepping the bounds of prudence, it may be finally suggested that the occurrence within the Australian region, embracing New Zealand, of such a wealth of archaic types such as the mesozoically related lizard *Hatteria* and the fresh-water fish *Ceratodus*, as also a dominant mammalian fauna that pre-existed, but is now extinct, in other continents, would justify the anticipation that a reptile inheriting the phenomenal habits of a Mesozoic race might be sought for with the greatest prospects of success upon Australasian territory.

W. SAVILLE-KENT.

NOTES.

THE list of Presidents for the ten Sections of the British Association, for the Liverpool meeting in September next, has been published. All the Sectional Presidents having accepted the nominations, the list may be regarded as definitive. President of the Association—Sir Joseph Lister, Bart., P.R.S. Section A—Mathematics and Physics, Prof. J. J. Thomson, F.R.S. Section B—Chemistry, Dr. Ludwig Mond, F.R.S. Section C—Geology, Mr. John Edward Marr, F.R.S. Section D—Zoology, Prof. E. B. Poulton, F.R.S. Section E—Geography, Major Leonard Darwin. Section F—Economics, Right Hon. Leonard Courtney, M.P. Section G—Mechanical Science, Sir Charles Douglas Fox. Section H—Anthropology, Mr. Arthur Evans (Keeper of the Ashmolean Museum, Oxford). Section I—Physiology and Pathology—Dr. Walter Holbrook Gaskell, F.R.S. Section K—Botany, Dr. D. H. Scott, F.R.S. Evening discourses will be given by Prof. Flinders Petrie and, probably, by Sir Andrew Noble. The lecture to working men will be given by Prof. Fleming, F.R.S.

THE Toronto Local Committee are assiduously engaged in preliminary work for the meeting of the British Association for the Advancement of Science in 1897. Meetings of the executive committee are held every fortnight. Besides the executive committee, a number of sub-committees are at work, including those on finance, conveyances, publication and printing, rooms for offices, meetings of the association and committees, hotel and lodgings, press, hospitality, reception, and for securing cooperation of other institutes, associations, and corporations, postal, telegraph and telephone facilities. The attention of the committee on conveyance has already been called to the desirability of securing from the Canadian Pacific Railroad transportation for such members of the Association as may desire to extend their travels to the Pacific coast, with special reference to the suggestion that a meeting of the American Association for the Advancement of Science may follow the Toronto meeting, if adequate facilities for transportation are assured. This suggestion is based upon the fact that the American Association have already once voted in favour of such a meeting if satisfactory rates could be obtained; and the hope is still entertained that delegates from both British and Australasian Associations might find San Francisco a convenient point at which to meet the American Association. Mr. Griffith, the general secretary of the British Association, is expected to be in Toronto about May 22, to make arrangements for the meeting, and set out the proper lines of work.

FROM McGill University, Montreal, comes the information that Röntgen's experiments were not only repeated there with considerable success immediately on the announcement of his results in America, but have been applied to two important medical cases within the first week of their demonstration. Before any full description of Röntgen's method had crossed the ocean, Prof. Cox was enabled by a lucky guess, and with the aid of the fine McDonald apparatus, to reach success at the first attempt. Four days later a photograph was obtained, clearly showing the bones of the leg from the knee downwards, with the image of a bullet (which had been there for seven weeks and was causing trouble) clearly defined between the two bones, and resting against the inner angle of the tibia. The same photograph showed a copper wire which had been bound round the leg as a fiducial mark from which to measure. The bullet was six centimetres below the wire. On the following day the bullet was reached at a depth of two inches, and was extracted successfully. The exposure required for this photograph was forty minutes. The Pulüj tube (Geissler Catalogue 3080) has been found by Prof. Cox to be superior to any others tried. Its fluorescing screen seems to protect the glass, and is far brighter than that of the other tubes. It gave continuous exposures of 65 minutes without injury, and has since been used to detect a fracture of the ulna, and to produce a photograph of the hand, with perfect definition.

OUR U.S. correspondent writes under date February 14:—"The new photography continues to be the absorbing topic in scientific circles, and innumerable experiments and results are reported. Dr. Henry W. Cattell, of the University of Pennsylvania, has taken pictures of anatomical preparations with such success, that he infers it will be easy to obtain pictures of acromegaly, osteitis deformans, rheumatoid arthritis, &c. Prof. W. F. Magie, of Princeton, has invented a new instrument for use in diagnosis. A sheet of black paper, coated on one side with barium platino-cyanide, is placed with the coated side inward across the end of a tube or box, into which the observer looks, and which is so fitted to the face, or so shielded by cloths, that the phosphorescent substance and the eyes are protected from all extraneous light. If the tube be then directed towards the excited Crookes' tube giving the Röntgen rays, the phosphorescent paper in the tube glows, and the shadows of objects interposed between it and the Crookes' tube appear upon it. The first successful experiments in Brooklyn are by Prof. William C. Peckham, at the Adelphi Institute, using more direct methods than have heretofore been used, with a current of 3½ amperes and an electrical pressure of six volts. Dr. A. Mau succeeded in obtaining a photograph of a key, covered by a board, by five hours' exposure to direct sunlight. Elaborate experiments are in progress at Columbia, under the direction of Profs. Rood, Papin, and Hallock, with a prospect of important results."

WITH reference to the report that Prof. Salvioni had discovered how to make directly visible the bones of the hand by means of Röntgen rays, the Rome correspondent of the *British Medical Journal* says:—" At a meeting of the Perugia Medico-Chirurgical Society, held on February 5, Prof. Salvioni, teacher of physics at the University, made a most important communication on the new results obtained by him in Röntgen's rays. In studying the question, his aim was to invent an apparatus which would enable one to see direct and without the intervention of photography certain bodies enclosed in wood, flesh, cardboard, &c. He therefore studied the possibility of rendering the retina sensitive to Röntgen's rays. In this he has succeeded by inventing an apparatus which he has called a cryptoscope, which he exhibited at the meeting, and by means of which one can clearly see the contours of the bones of one's own hand, objects enclosed in cardboard boxes, leather purses, &c. This apparatus is very simple, and consists of a black cardboard tube enclosed at one end with a disc of black cardboard coated internally with a fluorescent substance (barium platino-cyanide, sulphate of calcium, &c.); in the other end is placed a lens which permits one to clearly see the fluorescent surface. The object to be observed is placed before the luminous source given by a Crookes' tube, and then one looks at it through the cryptoscope placed at a suitable distance. As in the fluorescent cardboard the parts of the object impermeable to Röntgen's rays are drawn in shadow, thus one clearly sees the contours of the bones of the hand, &c. A model of the instrument was made under the direction of Prof. Blasema at the Physical Cabinet of the Roman University on February 11, and with it one could clearly see the bones of one's own hand, coins in a purse or the clenched hand, &c. It is evident from these results that the apparatus, when perfected, will be of great use in medicine and surgery."

THE current number of the *Comptes rendus* contains no less than seven papers bearing on the Röntgen rays. In following up the analogy of certain properties of these rays with some properties of the ultra-violet rays, M. R. Swyngedauw has found that the X-rays cause a lowering of the explosive potential according to the same general laws as the electrically active ultra-violet rays. Whilst the influence of the latter, however, is entirely suppressed by interposing a screen of wood, glass, or blackened paper, these materials do not affect this property of the Röntgen rays. It was also noticed that these rays lowered the dynamic explosive potentials to a greater extent than the static potentials. As a result of the study of the property of the Röntgen rays of discharging an electrified body, M. A. Righi concludes that the time necessary for a given fall of potential is practically the same, whether the original charge be positive or negative. With an initial positive charge the discharge is not complete; but if negative initially, not only is the discharge complete, but the disc becomes positive. The results obtained by MM. J. J. Borgman and A. L. Gerchun, however, are precisely contrary to these, a positively charged disc losing its charge nearly instantaneously, and becoming negative on prolonged exposure to a Crookes' tube. MM. L. Benoist and D. Hurmuzescu contribute further researches on the same subject of a quantitative character. By measuring the time required for a given reduction of angle between the leaves of an electroscope, and the distance of the leaves from the Crookes' tube, they prove that the ratio of the times are as the ratio of the squares of the distances. From the coefficient of transmission (0·85) of an aluminium plate, 0·1 mm. thick, it is shown that a plate of aluminium 15 mm. thick, such as was used by Röntgen in his original experiments, must be practically opaque to the rays *unless the rays are heterogeneous.* In an extract from a letter by M. de Heen, an ingenious experiment is described which proves conclusively that the X-rays proceed from the anode, and not the kathode. A leaden plate perforated with holes is placed between the Crookes' tube and the photographic plates, and the direction of the bundles of rays thus obtained shows clearly that these rays are anodic.

DR. M. ARMAND RUFFER has resigned the post of Director of the British Institute of Preventive Medicine, and has been appointed Professor of Bacteriology at the Medical School of Cairo, vice Dr. Kaufmann, resigned.

COLONEL C. F. CROCKER, a member of the Regents' Committee of the Lick Observatory, has undertaken to pay the expenses of an expedition which will be sent from the Observatory to Japan to observe the forthcoming solar eclipse. The expedition will be under the direction of Prof. Schaeberle, and its programme will be wholly photographic.

CHARLES WACHSMUTH, well known as a palæontologist in the line of Crinoids, died suddenly at Burlington, Iowa, February 17, aged sixty-six years. He was a native of Germany, and had spent forty years in scientific research among the Crinoids of the Mississippi Valley and the Tennessee Mountains.

THE deaths are announced of Prof. J. Graindorge, Professor of Mathematical Physics and Kinematics at Lüttich; M. Abel Hovelacque, the distinguished Anthropologist and Orientalist, at Paris; Dr. K. Stölzel, Professor of Technical Chemistry and Metallurgy in the Technical High School at Munich; Dr. P. Hedenius, Professor of Pathology and Pathological Anatomy at Upsala.

THE progress in electric propulsion appears in many ways. Electric motors have been tried and will be substituted for steam on the New York and Brooklyn Bridge as a means of switching trains at the termini, thus practically doubling the capacity of the bridge. A Westinghouse system railroad locomotive, the first one constructed, has just been completed at Philadelphia, and sent to Pittsburgh for its electric equipment. A speed of 200 miles an hour is claimed. Experiments indicate that electricity will soon supplant steam as a motor on the entire New York elevated railroad system.

THE following prizes have recently been awarded by the Académie Royale de Belgique: M. J. Verschaffelt, 600 francs for his work on the determination of molecular weights of bodies in solution; M. E. Haerens, 1420 francs (Prix Charles Lemaire) for the best treatise on public works. The following have been elected Foreign Associates of the Academy: Profs. Sylvester (Oxford), Cannizzaro (Rome), Strasburger (Bonn), Cope (Philadelphia), M. Marey (Paris), and Sir Archibald Geikie (London). M. Fraipont (Liège) has been elected Correspondant in the Natural Science Section.

ALL who are working for the reform of our system of weights and measures will be interested to know that the Swiss Government have recently invited the countries parties to the Berne Convention—in other words, all the leading countries of the continent of Europe—to a conference to discuss *inter alia* the introduction of a uniform gauge of screws based on the metric system. Mr. W. M. Acworth remarks in the *Times* that, according to the official document, this gauge is intended to take the place of the "so-called Whitworth system, based on English measures, which is at present in use under various forms." It is pointed out that there is an immense advantage in having the material for the repair of rolling-stock, which often travels thousands of miles from home, interchangeable. It is added, moreover, that, if the way to this reform be once opened under the lead of railways, private manufacturers may be confidently expected to promptly follow suit.

The spring meeting of the Iron and Steel Institute will be held in London, at the Institution of Civil Engineers, on May 7 and 8; and the autumn meeting will be held at Bilbao at the beginning of September, under the presidency of Sir David Dale. Special arrangements are being made for the autumn meeting, the programme for which will include visits to the important Spanish mines, from which so large a proportion of the iron ore used in Great Britain is obtained. Owing to the limited hotel accommodation at Bilbao, arrangements are being made to secure one of the Orient Company's steamers to convey the members to Bilbao and back, and to serve as a floating hotel. It is proposed that the cruise should last a fortnight, and that calls should be made at some of the Spanish and French watering-places.

In a letter to the *Times*, Admiral Richards briefly reviews Dr. Nansen's expedition and the report of its having reached the North Pole. It will be remembered that Nansen's intention was to place his ship in the solid ice off the coast of Siberia and to drift with it across the Pole into the Greenland Sea, believing it would be carried there by a current. Admiral Richards points out, however, that in the Polar basin proper it is doubtful if the ice ever finds an exit. The ships which entered on its confines in Wellington Channel found it blocked there; M'Clure also found it blocked between Banksland and Melville Island. Nares could not get a mile north from the top of Smith Sound for very heavy ice, and the only channel it could escape by is the Greenland Sea, of which there is no evidence, while by Davis Strait great numbers of bergs and enormous quantities of ice are constantly passing down in the months of July and August, but none of it from the Arctic basin proper. These facts, remarks Admiral Richards, tell strongly against Nansen's succeeding in his original project, but they need not have been an obstacle in his reaching a certain distance north from the coast of Siberia.

The anniversary meeting of the Geological Society of London was held on Friday, when Dr. Henry Hicks, F.R.S., was elected President for the ensuing year. The retiring President (Dr. Edward Woodward) delivered his anniversary address, which dealt with the life-history of the Crustacea in later Palæozoic and in Neozoic times. The following awards of medals and funds were made: The Wollaston medal to Prof. E. Suess; the Murchison medal, and part of the proceeds of the Murchison fund, to Mr. T. Mellard Reade; the Lyell medal, and part of the proceeds of the Lyell fund, to Mr. A. Smith Woodward; balance of the Wollaston fund, and part of the proceeds of the Barlow-Jameson fund, to Mr. Alfred Harker; balance of the proceeds of the Murchison fund to Mr. Philip Lake; moiety of balance of proceeds of Lyell fund to Dr. W. F. Hume; moiety of balance of proceeds of Lyell fund to Mr. C. W. Andrews; moiety of balance of proceeds of Barlow-Jameson fund to Mr. Joseph Wright; moiety of balance of proceeds of Barlow-Jameson fund to Mr. John Storrie.

We understand from the *Lancet* that the arrangements for the next International Congress, which will be held in Moscow in August 1897, are now being worked out by the special Committee appointed for the purpose. There will be twelve sections, as follows: (1) anatomy, (2) physiology, (3) general pathology and pathological anatomy, (4) general therapeutics, (5) internal diseases, (6) children's diseases, (7) nervous and mental diseases, (8) dermatology, (9) surgery and diseases of the eye, (10) midwifery and gynæcology, (11) hygiene, and (12) legal medicine. The Government has assigned 35,000 roubles for the expenses of the congress. The official language of the congress will be the French language, but in the general meetings, of which there will be three, communications may be made in any European tongue. In the sectional meetings only three languages will be admitted—namely, French, German, and Russian. Englishmen must regret that they will be debarred from making communications in their own tongue to the sectional meetings, and that their only opportunity of reading papers in the English language will be in the three general meetings.

The scientific study of the mental and physical condition of children, carried out by Dr. Francis Warner in connection with a Committee of the Congress of Hygiene, has led to results which claim full consideration. Dr. Warner gave an account of his investigations before the Royal Statistical Society last week. It appears that defective development is more frequent in boys than in girls, and more associated with nervous disorder in the former and with delicacy and dulness in girls. Mental dulness is found much associated with irregular movement and action, especially among boys, showing that physical exercises should form a part of brain culture in school. Dealing with the question of mental dulness, Dr. Warner showed that the want of physical training of the brain appears to be a more frequent cause than defective development of the body. Defective physiognomy and proportioning of the features and parts of the body is often associated with mental dulness, but the occurrence of brain disorderliness, indicated by observable signs, is a more general and direct cause. Both defect in development and nerve disorderliness, either alone or in combination with low nutrition, are much associated with mental dulness. From the facts collected, Dr. Warner has been able to deduce the indications of some of the physical causes of defect of body, defect of brain, and mental dulness. It is to be hoped that it will be possible to continue such research beyond the metropolitan area, and that a commission might be appointed by the Government to consider the many important recommendations on national education resulting from the investigation thus far completed.

The ancient and familiar process used in the manufacture of linen, and known as the "retting" of flax, has long eluded all endeavours to place it upon a sound scientific basis. Prof. Winogradsky, of St. Petersburg, has, however, recently shown that it is directly dependent upon the action of particular bacteria. Considerable difficulty was experienced in discovering the special microbes responsible for the process, and several different varieties were isolated by means of gelatine plate culture from the retted or fermented flax; but in no case, when inoculated on to sterilised flax, did retting ensue. When, however, portions of retted flax were added to the sterilised flax, vigorous fermentation was set up in from twelve to fifteen hours. In the next series of experiments pieces of sterilised flax were inoculated, placed in tubes containing water, the surface of which was sealed from the air by means of a film of oil. In this manner, after a long series of successive inoculations, a somewhat large, spore-forming bacillus was discovered, which subsequent experiments proved to be the specific microbe responsible for the retting of flax. It was obtained in a condition of undoubted purity by anaërobic cultivation on slices of potato which were rubbed over with chalk, and from these cultures the retting of sterilised flax was accomplished with the greatest ease. Prof. Winogradsky is of opinion that the so-called pectic fermentation, by which is understood the transformation during retting of insoluble pectic substances into soluble, must now be regarded as a fermentation process in the strict bacteriological sense of the word.

In the *Meteorologische Zeitschrift* for December 1895, Prof. G. Hellmann discusses the yearly period of storms in Europe, with especial reference to the so-called equinoctial gales. In order not to entirely omit large districts, observations both at stations with and without anemographs have been utilised, and he has deduced the yearly period at some fifty stations; but, partly not to complicate the discussion, and partly from want of necessary details, no account has been taken of the duration, force and direction of the storms. The position of the station has a great influence upon the yearly period; a place with a good western exposure will have more westerly storms than a station with an easterly exposure, and *vice versâ*. The author finds that in the extreme south-west of Europe March is the most stormy month; this is very marked at San Fernando, near Cadiz, where 45 per cent. of all storms occur in that month. Further northwards, on the Atlantic coast, the March maximum gradually recedes; and on the coasts of France, the British Isles, and Norway, there is a decided maximum in January, and at some inland places this also holds good. This agrees with the results obtained by Mr. R. H. Scott for the British Isles (*Quarterly Journal* of the Roy. Meteor. Society, 1884), who showed that mid-winter was the stormiest season. The stations of South Norway and part of North Germany show a considerable increase of storms in October, but there is a great variation in the yearly period in relatively small districts. The author considers that although storms do not preponderate exactly at the times of the equinoxes, the popular theory holds good to a certain extent, that they frequently occur near those seasons; and that if the year be divided into two parts—one of stormy, and one of relatively calm weather—the months of March and October must be taken as the limiting periods, at all events over a great part of Europe.

WE have received an atlas of the "isanomales" and of the lines of secular change of the earth's magnetism, by Lieut.-General Alexis de Tillo. The atlas contains sixteen maps, which give the isanomales and the lines of equal secular change of the declination, dip, horizontal force, vertical force, and total force for the epoch 1859. In addition there are two maps showing the agonic lines for the epochs 1700, 1800, and 1859, and the lines of maximum secular change in declination for the epochs 1745, 1810, and 1859. The author, from an examination of these maps, concludes that with reference to each of the magnetic elements the globe can be divided into two hemispheres by a great circle approximately parallel to the meridians. In one of these hemispheres the values of the magnetic element are greater than in the other hemisphere, and there is a similarity between the general lie of the isanomales (*i.e.* of the lines of equal departure of each element from the mean value of the element along a parallel of latitude) of the several elements. The agonic lines are reproduced on the maps of the isanomales of dip, vertical force, and of magnetic potential. In particular the places at which the declination is zero coincide with the points of maximum or minimum value of these elements along the parallels of latitude. The isanomales of the horizontal force show that in general in those parts of the surface of the earth at which the declination is westerly the horizontal force is less than in the parts of the surface of the earth at which the declination is easterly. An indication of the Siberian oval appears on the vertical force and dip charts, while on the horizontal force and total force charts there is an indication of a similar oval near the Sandwich Islands.

THE belief in the vampire—that is, a spirit which leaves its dead body in the grave to visit and torment the living—is a very ancient and widely-spread superstition. It is startling to find, according to Mr. G. R. Stetson (*The American Anthropologist*, ix. p. 1), that this ghastly belief still persists in Rhode Island, U.S.A. Persons now living claim to have had their life saved from death by consumption by the exhumation, mutilation, and generally the cremation of some member of their families who had died a short time previously. In the same journal, Dr. J. W. Fewkes has a preliminary article on Tusayan Ethno-botany. This is a subject which has not received the attention it deserves, and it would be well if residents in our colonies and dependencies, who have a taste for botany, would preserve the transient plant-lore of our native races.

WHILE the old-fashioned view of igneous rocks as merely accidental and irregular intruders into the regular sedimentary series has been greatly modified by the results of petrological researches, it is not often that it is found possible, from an investigation of rock-structures, to obtain so complete an account of a series of events in a district as Messrs. Holland and Saise have recently done in the Giridih coalfield in Bengal. They show how a liquid rock-magma of highly basic composition was injected as a series of dykes through the rocks of this area at a temperature so high that near the dykes the coal was coked and columnar structure developed in it, while sandstones were so far fused that they came to closely resemble siliceous lavas. This magma was rich in chlorine, as the abundance of apatite in it shows, and from it thermal waters conveyed chlorides in solution to permeate the rocks around. This permeation by chlorides produced marked changes in certain more ancient igneous rocks, so that when at a later stage earth-movements crushing them led to their metamorphism and re-crystallisation, the results of that metamorphism were quite different in the areas where the chloride-permeation had and had not been effected. Where there were no dykes to supply the chlorides, hornblende-schists were produced; in the neighbourhood of the dykes, scapolite rocks were formed. These and other interesting facts are worked out in convincing manner in a paper contributed to the *Records* of the Indian Geological Survey (vol. xxviii. pt. 4).

MR. CHARLES J. JOLY, Fellow of Trinity College, Dublin, is editing an annotated edition of Sir W. Rowan Hamilton's "Elements of Quaternions." The work is now passing through the press.

AN important article on "Venezuela: her Government, People, and Boundary," by Mr. W. E. Curtis, appears in the February number of the *National Geographic Magazine*, illustrated by pictures of La Guayra, and the Valley of Caracas, east and west of the capital.

WE have received the second volume of meteorological data, published by the U.S. Weather Bureau, containing the results of observations made during 1893, and, as a special contribution, the records in detail of temperature, pressure, and wind at Pike's Peak and Colorado Springs.

A SET of thirteen "Laboratory Tables for Qualitative Analysis," drawn up by the Demonstrators in Chemistry of the Owens College, has been published by Mr. J. E. Cornish, Manchester. The tables are printed upon cards apparently intended for use in chemical laboratories, so that students can be drilled in the mechanical operations of analysis.

THE second "Psychological Index," published annually as part of the *Psychological Review*, has just been issued. The index is a bibliography of the literature of psychology and cognate subjects for 1895, compiled by Dr. L. Farrand and Mr. H. C. Warren. To psychologists, this well-arranged and complete list of published books and papers must be invaluable.

A SECOND edition of "The Methods of Microscopical Research," by Mr. Arthur C. Cole, has been published by Messrs. Baillière, Tindall, and Cox. The book is a practical guide to microscopical manipulation, embodying descriptions of many original processes and methods of work. The first edition was well received, and the second, much enlarged and in great part re-written, will assuredly be just as successful.

A VOLUME has been received containing the results of rain, river, and evaporation observations made in New South Wales during 1894, under the direction of Mr. H. C. Russell, C.M.G., F.R.S. Two new maps of the colony have been introduced into the report, one showing the average monthly temperature in each square degree, and the other showing the temperatures of spring, summer autumn and winter, also the mean temperature for the year, and the highest and lowest temperatures ever recorded in each square degree.

MESSRS. G. BELL AND SONS have published a dainty brochure on the Koh-i-Nur diamond and the celebrated Pitt diamond, reprinted from Mr. E. W. Streeter's "Great Diamonds of the World." Mr. Streeter prints a letter received from Mr. J. Ball in 1882, containing an opinion against the identity of the Great Mogul and Koh-i-Nur diamonds; but he does not seem to have made much use of the detailed history of the Koh-i Nur in relation to the Great Mogul, as told by Prof. Story-Maskelyne in these columns in 1890 (vol. xliv., p. 555).

THE Library Bureau has sent us the first number of this year's "New Book List"—a catalogue of British literature published during January—compiled and arranged by Mr. Cedric Chivers. We have also received a specimen of a card catalogue which has been inaugurated with the list. It is proposed to publish at monthly intervals, and at a low price, a catalogue of new publications, printed on cards. Every book published will be catalogued under the author's name, and full particulars of the book will be printed upon the card. The card catalogue thus constructed should be of great service in libraries and other institutions.

A CATALOGUE of the "Students' Geological Collection" of the Bristol Museum has just been issued by Mr. E. Wilson, the Curator. This is a special collection of the commonest fossils of British formations, and of typical rocks and minerals, which is available, under proper conditions, for actual handling by elementary students. Such a collection must both be a boon to those who use it, and save the general collections from possibility of misuse. As the specimens are carefully selected, and the localities of almost all are given, the list may prove useful as a suggestion for the formation of similar ones elsewhere. From the same source comes the sixth edition of the popular penny guide to the Bristol Museum.

THE Magnetical and Meteorological Observatory of the Royal College of Belen, Havana, has published a pamphlet on the circulation and cyclonic translation of West India hurricanes, which was originally prepared by the late Father B. Viñes for the Chicago Congress. The paper is one of considerable importance upon the subject in question, as the author spent twenty-three years of his life in constant study of the storms in that part of the world. The first section deals with the general laws of cyclonic circulation and the relations of the movements of cirrus and other clouds to the locality of the centre of disturbance. The second part explains at considerable length the laws of the translation of the disturbance in different months, and its rate of travel in various parts of its path. It is well known that the West India hurricanes first advance towards the west, then turn northwards and recurve towards east-north-east or north-east. The rate of progress is found to differ in various parts of the path, and according to different seasons and latitudes. On these important points and their practical application to navigation Father Viñes' long and attentive studies have led to very valuable results. The work is written in the Spanish language.

THE Society for the Protection of Birds reports progress. The total number of members is now 13,134, no less than 1673 names being enrolled during the year 1895. Various are the reasons which result in an increase of membership of the Society. Naturalists join because they desire to prevent the extermination of rare species, many people become members from æsthetic considerations, and others because they have regard for the feelings of birds. The Society mourns a "deplorable outbreak of savagery in female adornment"—to wit, a recrudescence of the feather-wearing fashion, especially a rage for aigrettes. But, apart from this, the Committee reports the existence of a growing desire in the country to preserve its wild bird life. It is certain that in 1895, such signs have been more frequent and unmistakable than in former years. A greater and ever-increasing impatience is felt against the annual massacre, in August and September, of gulls, terns, guillemots, razorbills, puffins, and other sea-birds on our coasts; the shooting of every rare bird, in the interests of private collectors; the wholesale trapping of songsters, 70 per cent. of which perish within a week of capture, by unlicensed bird-catchers; and the use of the pole-trap. We give our support to the remark that last year was astonishingly prolific in ornithological literature, scientific and popular: it is certain that so large a number of books on the bird-life of the British Islands has not appeared in any previous year. These works should have a beneficial influence upon the Society.

THE preparation of metallic carbides in the electric furnace has, as is now well known, led to an easy method for the direct synthesis of pure acetylene, this gas being produced by the action of water upon the carbides obtained from the alkaline earths. But all metallic carbides do not behave similarly towards water; some (chromium, molybdenum, titanium) being unacted upon at ordinary temperatures, others (aluminium, beryllium) giving methane. In a recent number of the *Comptes rendus* (February 10), M. H. Moissan gives a detailed account of the preparation and properties of uranium carbide. This substance, which has the composition $C_3.Ur_2$, does not differ to any marked extent in its general chemical and physical properties from other substances of the same class, except in its reaction with water. This gives rise to a complex series of solid, liquid, and gaseous hydrocarbons. Of these, only the last have been completely examined, the analysis of the gaseous mixture showing hydrogen (13 per cent. to 15 per cent.), methane (78 per cent. to 80 per cent.), and ethylene (5 per cent. to 7 per cent.), together with a trace of acetylene. M. Moissan, remarking on the presence of the hydrogen, points out that this is probably produced by a secondary reaction, the lower oxide of uranium being able to decompose water. The acetylene also is stated to be probably due to the presence of a little calcium carbide as an impurity.

THE researches of M. Guntz, on the preparation of metallic lithium and its nitride, have led to the discovery of a hydride of this metal possessing some remarkable properties. Wishing to heat some lithium in a current of an inert gas, and nitrogen being obviously excluded, some lithium was raised to a bright red heat in a current of hydrogen, when, much to the astonishment of M. Guntz, the whole caught fire and burnt with flame in the tube, depositing a white powder, and leaving no trace of unburnt lithium. On analysis this proved to have the composition LiH, and is noteworthy as giving the maximum weight of hydrogen on treatment with water for minimum weight of substance, one kilogram giving 250 grams, or 2780 litres of hydrogen. It is not deliquescent, and alters very slowly in air, and is stable at a full red heat, thereby differing from the previously known hydrides of the alkali metals. Heated in a current of nitrogen converts LiH into Li_3N.

THE additions to the Zoological Society's Gardens during the past week include a Lion (*Felis leo*, ♂) from Africa, presented by Mr. Rowland Ward; a Common Squirrel (*Sciurus vulgaris*), British, presented by Mrs. Herbert Morris; a Woodlark (*Alauda arborea*); a Whinchat (*Pratincola rubetra*), British, presented by Mr. J. Young; a Black Tanager (*Tachyphonus melaleucus*) from South America, presented by Madame Caté; a Rhinoceros Hornbill (*Buceros rhinoceros*, ♂) from the Malay Peninsula, deposited; two Black-necked Stilt-Plovers (*Himantopus nigricollis*) from South America, a Long-eared Owl (*Asio otus*), two Common Pheasants (*Phasianus colchicus*, ♀ ♀), British, purchased.

OUR ASTRONOMICAL COLUMN.

CASSEGRAIN AND GREGORIAN REFLECTORS.—For some time past, Prof. Schaeberle, of the Lick Observatory, has been experimenting on the applications of these rather neglected forms of reflecting telescopes with the special view of applying them for celestial photography. The field of view in such instruments is darker than in refracting telescopes, and if the mirrors are good, there is every reason to expect that in planetary photography the results obtained by a telescope twelve or fifteen feet in length will be at least equal to those obtained with the most powerful refractors. There is so little published on the theory of the instruments that Prof. Schaeberle has re-investigated the fundamental formulæ, which may be useful to many observers (*Astronomical Journal*, No. 364). In the case of the Cassegrain it is easily shown that the secondary mirror must theoretically be the convex side of an hyperboloid of revolution, while in the Gregorian it must be the concave side of an ellipsoid of revolution; in both cases the axis and focus of the secondary reflector must coincide with those of the primary. If F denote the focal length of the parabolic reflector, H the distance between the centre of the mirror and the secondary focus (being negative when it falls between the two reflectors); the axial radius of curvature of the secondary reflector; L the equivalent focal length of the combination; then, for both forms

$$\mathrm{L} = \frac{\mathrm{F}}{r}\left\{(\mathrm{F}+\mathrm{H}) \pm \sqrt{r^2 + (\mathrm{F}+\mathrm{H})^2}\right\} \quad . \; . \; . \; (1)$$

$$r = \frac{2\mathrm{LF}(\mathrm{F}+\mathrm{H})}{\mathrm{L}^2 - \mathrm{F}^2} \quad . \; . \; . \; . \; . \; . \; . \; . \; . \; . \; . \; . \; (2)$$

$$\mathrm{H} = \frac{r(\mathrm{L}^2 - \mathrm{F}^2)}{2\mathrm{LF}} - \mathrm{F} \quad . \; . \; . \; . \; . \; . \; . \; . \; . \; . \; . \; . \; (3)$$

These formulæ refer to the theoretical conditions for perfect definition; in practice, the secondary mirror is so small that for the same value of r, a spherical surface, or a paraboloid, hyperboloid, or ellipsoid, of any eccentricity, gives tolerable images, the size of which may be varied by simply moving the secondary along the optic axis. There will, however, always be a point of best definition; and if this does not give a convenient position for the secondary focus, the eccentricity of the small reflector must be altered by local polishing. The figuring of the secondary mirror is too delicate for direct measurements, and can only be tested in the telescope itself.

WELLS' ALGOL VARIABLE.—Further particulars of the new variable of the Algol type in the constellation Delphinus (NATURE, vol. liii. p. 206) are given in *Harvard Observatory Circular*, No. 5. The observations so far obtained show that its time of minimum, uncorrected for the velocity of light, can be closely represented by the formula J.D. 2412002·5 + 4·8064 E. For nearly two hours before and after the minimum it is fainter than the twelfth magnitude, but it is not yet possible to say how faint it really becomes. The increase of brightness takes place at first very rapidly, but afterwards more slowly, and the full brightness, magnitude 9·5, is reached in about five hours. Numerous photographs indicate that during the four days between the minima, the brightness is sensibly constant. The changes can be explained on the assumption that the star revolves about a relatively dark body, and that it is totally eclipsed at the minimum, the light then, if any, being that of the companion. The conditions are accordingly somewhat similar to those of U Cephei. The new variable is BD + 17° 4367, its R.A. and decl. for 1900 being respectively 20° 33′·1 and + 17° 56′.

THE NEW COMET.—From observations of the new comet, Perrine-Lamp, made on February 15, 16, and 17, the following elements and ephemeris for Berlin midnight have been computed by Dr. Lamp:

T = 1896 January 31·999 Berlin mean time.

$$\left.\begin{array}{l} \omega = 358^\circ\ 38'\ 16'' \\ \text{☊} = 208\ \ 36\ \ 29 \\ i = 155\ \ 30\ \ 15 \end{array}\right\} 1896{\cdot}0$$

$$\log q = 9{\cdot}77022$$

	R.A. h. m. s.	Decl. ° ′	Brightness.
Feb. 27	22 59 40	+ 46 8·7	
,, 29	23 54 31	+ 49 49·2	0·9

M. Bigourdan, who observed the comet at Paris on February 16, states that the comet was not then visible to the naked eye, though bright enough to be easily seen in a telescope of 50 mm. aperture. It was observed to be round, about 2′ in diameter, with a diffuse central condensation about 20″ in extent. At the centre of this condensation a small stellar nucleus was occasionally suspected. No tail was visible.

PERRINE'S COMET (1895).—Dr. E. Lamp has drawn our attention to a misprint in the ephemeris of Perrine's comet, given in NATURE on January 23; the declinations throughout should be placed a line lower. Hence our statement last week, that on re-discovery the declination of the comet was a degree in error was unfounded; as a matter of fact, the corrections to the ephemeris were only + 4s. and + 0′·5. The following is a corrected and extended ephemeris:—

	R.A. h. m. s.	Decl. °	Brightness.
Feb. 29	19 46 48	+ 1 55·1	0·12
Mar. 4	46 41	3 0·7	0·11
,, 8	19 46 16	+ 4 6·7	0·10

M. Bigourdan describes the comet as being round, with a diameter of about 50″, and showing a somewhat diffuse nucleus. It is seen with about the same facility as a star of the twelfth magnitude.

MAGNETIC SURVEYS.[1]

ON looking through these two volumes, the first thought that strikes one is that magnetical observations require a great deal of time for reduction and preparation for publication. In the Russian work, this great consumption of time is perhaps to some extent explained by the distance that separates the place of observation from any centre of civilisation, whence the results could be published, and the inevitable difficulties of communication. Perhaps still more is it to be explained by the fact, that several authors have to compile their separate portions under editorial supervision. Still, eleven years does seem a long interval to elapse between the completion of the observations and the distribution of the results to the public. In the Italian work; carried out in the cultured and accessible cities of Italy, six years have sufficed for the reduction and the printing.

This remark must not be construed as expressing any wish to minimise the difficulties that a scientific expedition to the wilds of North-East Siberia must of necessity encounter, or to make light of the dangers that these enterprising officers experienced in their expatriation, cheerfully endured for scientific ends. One disaster that these scientific experts had to undergo may be mentioned, as it illustrates not only the severities under which they were placed, but the readiness of resource with which they remedied the mishaps, far away from trained workmen and mechanical apparatus. On August 6, 1882 (about the time of the Fort Rae Expedition, it may be remarked), when nearing their destination, they experienced a north-east storm of more than an unpleasant character, which carried their craft on to the rocks, and tumbled their apparatus into the water. The chest containing the instruments for observing the magnetic variation at Ssagastyr (Long. E. 8h. 26m.; Lat. 73° 23′ N.) remained some hours at the bottom, before it could be successfully landed,

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[1] "Beobachtungen der Russischen Polarstation an der Lenamündung." I. Theil Astronomische und Magnetische Beobachtungen 1882–1884." Bearbeitet von V. Fuss, F. Müller und N. Jürgens. Herausgegeben von Dr. A. v. Tillo, 1895.

"Misure Assolute degli Elementi del Magnetismo Terrestre, eseguite in Italia negli anni 1888 e 1889 dal Dott. Luigi Palazzo." (Roma, 1895.)